Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Claims 1-86 (canceled)

Claim 87 (new): A synthetic polymer complement ("SPC") comprising a crosslinked three-dimensional polymeric network having a diameter less than about 1000 nm and comprising target binding sites on its surface, the target binding sites being complementary to at least a portion of the surface topology and force field of a target, and wherein the polymeric network is comprised of monomers consisting of at least one crosslinking group and at least one head group selected from the group consisting of sugars, proteins, and carbohydrates, which head group is a functional group capable of undergoing a binding interaction with a site on the target.

Claim 88 (new): A synthetic polymer complement according to claim 87, wherein the SPC is capable of specific recognition of the target.

Claim 89 (new): A synthetic polymer complement according to claim 87, wherein the target binding sites comprise three-dimensional cavities complementary to at least a portion of the surface topology and force field of the target.

Claim 90 (new): A synthetic polymer complement according to claim 89, wherein the three-dimensional cavities retain their topological and force field complementarity to the target when they are not bound to the target.

Claim 91 (new): A synthetic polymer complement according to claim 87, wherein the target is selected from the group consisting of organic compounds, toxins, pollutants, pathogens, synthetic drugs, steroids, steroid derivatives, proteins, glycoproteins, polysaccharides, lipids, lipopolysaccharides, polyanions, nucleic acid, porphyrins, substituted porphyrins, and active agents.

Claim 92 (new): A synthetic polymer complement according to claim 87, wherein the crosslinking group is selected from the group consisting of acrylate, methacrylate, acrylamide, vinyl ether, epoxide, methacrylamide, vinylbenzene, α-methylvinylbenzene, vinylbenzene, divinylbenzene, maleic acid derivative, diene, substituted diene, thiol, alcohol, amine, carboxylic

acid, carboxylic anhydride, carboxylic acid halide, aldehyde, ketone, isocyanate, succinimide, carboxylic acid hydrazide, glycidyl ether, silane, siloxane, chlorosilane, alkoxysilane, alkyne, azide, 2'-pyridyldithiol, phenylglyoxal, iodo, maleimide, aryl halides, imidoester, dibromopropionate, and iodacetyl.

Claim 93 (new): A synthetic polymer complement according to claim 87, wherein the crosslinking group is an acrylate, a methacrylate, an acrylamide, or a methacrylamide.

Claim 94 (new): A synthetic polymer complement according to claim 87, wherein the polymeric network is further comprised of monomers consisting of a crosslinking group without a head group.

Claim 95 (new): A synthetic polymer complement according to claim 94, wherein the crosslinking group is an acrylate, a methacrylate, an acrylamide, or a methacrylamide.

Claim 96 (new): A synthetic polymer complement according to claim 87, wherein the polymeric network is further comprised of monomers consisting of a crosslinking group, a head group, and a tail region.

Claim 97 (new): A synthetic polymer complement according to claim 96, wherein the tail region comprises a moiety selected from the group consisting of a poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(ethylene oxide)-co-poly(propyleneoxide) block copolymer, polysaccharide, a poly(amino acid), and a hydrocarbon moiety.

Claim 98 (new): A synthetic polymer complement according to claim 87, wherein the target binding sites comprise a surface having at least one functional group capable of undergoing a binding interaction with a site on a target.

Claim 99 (new): A synthetic polymer complement according to claim 87 which comprises from 1 to about 1000 target binding sites.

Claim 100 (new): A synthetic polymer complement according to claim 87 which comprises from 1 to 1000 binding sites and wherein the head group is a carbohydrate, the crosslinking group is acrylamide, and the target is a protein.

Claim 101 (new): A synthetic polymer complement according to claim 87 which comprises from 1 to 1000 binding sites and wherein the monomers comprise glucose-2-acrylamide.

Claim 102 (new): A synthetic polymer complement ("SPC") comprising a crosslinked three-dimensional polymeric network having a diameter less than about 1000 nm, and wherein the SPC is capable of binding a target, and wherein the SPC is formed by:

providing a set of monomers, at least some of the monomers comprising i) at least one head group, which is a functional group capable of undergoing a binding interaction with a site on the target, the head group being selected from the group consisting of sugars, proteins, and carbohydrates; and ii) at least one crosslinking group, which is a reactive group capable of covalently reacting to crosslink monomers of the monomer set;

contacting the set of monomers with the target to permit the monomers to self assemble on the target;

reacting the crosslinking groups of the monomers of the monomer set; and

removing the target;

to form the SPC comprising one or more three-dimensional binding sites on its surface, the binding sites being complementary in shape to at least a portion of the surface of the target.

Claim 103 (new): A synthetic polymer complement according to claim 102, wherein the crosslinking group is selected from the group consisting of acrylate, methacrylate, acrylamide, vinyl ether, epoxide, methacrylamide, vinylbenzene, α-methylvinylbenzene, vinylbenzene, divinylbenzene, maleic acid derivative, diene, substituted diene, thiol, alcohol, amine, carboxylic acid, carboxylic anhydride, carboxylic acid halide, aldehyde, ketone, isocyanate, succinimide, carboxylic acid hydrazide, glycidyl ether, silane, siloxane, chlorosilane, alkoxysilane, alkyne, azide, 2'-pyridyldithiol, phenylglyoxal, iodo, maleimide, aryl halides, imidoester, dibromopropionate, and iodacetyl.

Claim 104 (new): A synthetic polymer complement according to claim 102, wherein the crosslinking group is an acrylate, a methacrylate, an acrylamide, or a methacrylamide.

Claim 105 (new): A synthetic polymer complement according to claim 102, wherein the set of monomers further comprises monomers consisting of a crosslinking group without a head group.

Claim 106 (new): A synthetic polymer complement according to claim 105, wherein the crosslinking group is an acrylate, a methacrylate, an acrylamide, or a methacrylamide.

Claim 107 (new): A synthetic polymer complement according to claim 102, wherein the set of monomers further comprises monomers consisting of a crosslinking group, a head group, and a tail region.

Claim 108 (new): A synthetic polymer complement according to claim 107, wherein the tail region comprises a moiety selected from the group consisting of a poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(ethylene oxide)-co-poly(propyleneoxide) block copolymer, polysaccharide, a poly(amino acid), and a hydrocarbon moiety.

Claim 109 (new): A synthetic polymer complement according to claim 102, wherein the set of monomers further comprises a non-ionic surfactant.

Claim 110 (new): A synthetic polymer complement according to claim 102, wherein at least some of the monomers are amphiphilic.

Claim 111 (new): A synthetic polymer complement according to claim 102, wherein at least some of the monomers comprise a carbohydrate moiety.

Claim 112 (new): A synthetic polymer complement according to claim 102, wherein at least some of the monomers comprise styrene, divinylbenzene or vinylbenzoic acid, and wherein the set of monomers further comprises a non-ionic surfactant.

Claim 113 (new): A synthetic polymer complement according to claim 102 which comprises from 1 to about 1000 target binding sites.

Claim 114 (new): A synthetic polymer complement according to claim 102 which comprises from 1 to 1000 binding sites and wherein the head group is a carbohydrate, the crosslinking group is acrylamide, and the target is a protein.

Claim 115 (new): A synthetic polymer complement according to claim 102 which comprises from 1 to 1000 binding sites and wherein the set of monomers comprises glucose-2-acrylamide.

Claim 116 (new): A composition comprising a synthetic polymer complement ("SPC") of claim 87 in a pharmaceutically acceptable carrier.

Claim 117 (new): A composition according to claim 116, wherein the crosslinking group of the SPC is selected from the group consisting of acrylate, methacrylate, acrylamide, vinyl ether, epoxide, methacrylamide, vinylbenzene, α-methylvinylbenzene, vinylbenzene, divinylbenzene, maleic acid derivative, diene, substituted diene, thiol, alcohol, amine, carboxylic acid, carboxylic anhydride, carboxylic acid halide, aldehyde, ketone, isocyanate, succinimide, carboxylic acid hydrazide, glycidyl ether, silane, siloxane, chlorosilane, alkoxysilane, alkyne, azide, 2'-pyridyldithiol, phenylglyoxal, iodo, maleimide, aryl halides, imidoester, dibromopropionate, and iodacetyl.

Claim 118 (new): A composition according to claim 116, wherein the polymeric network of the SPC further comprises monomers consisting of a crosslinking group without a head group.

Claim 119 (new): A composition according to claim 116, wherein the polymeric network of the SPC further comprises monomers consisting of a crosslinking group, a head group, and a tail region.

Claim 120 (new): A composition according to claim 119, wherein the tail region comprises a moiety selected from the group consisting of a poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(ethylene oxide)-co-poly(propyleneoxide) block copolymer, polysaccharide, a poly(amino acid), and a hydrocarbon moiety.

Claim 121 (new): A composition according to claim 116, wherein the synthetic polymer complement comprises from 1 to 1000 binding sites and wherein the head group of the monomers of the SPC is a carbohydrate, the crosslinking group is acrylamide, and the target is a protein.

Claim 122 (new): A composition according to claim 116, wherein the synthetic polymer complement comprises from 1 to 1000 binding sites and wherein the monomers of the SPC comprise glucose-2-acrylamide.